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A  
NEW ESSAY  
ON  
FIORIN GRASS,  
INCLUDING  
THE HISTORY OF ITS DISCOVERY,  
AND  
AN ACCOUNT OF ITS VALUABLE QUALITIES,  
AND MODE OF CULTURE.

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BY  
WILLIAM RICHARDSON, D.D.

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WITH AN APPENDIX,  
CONTAINING  
SOME RECENT EXPERIMENTS,  
AND OBSERVATIONS BY THE EDITOR.

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## EPITOME OF THE CONTENTS.

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**ESSAY**  
**ON**  
**FIORIN GRASS.**

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I HAVE been often solicited to give to the world an History of Fiorin Grass; how far it was known previous to my discovery of its many invaluable qualities, and how I came to the discovery of properties, which, though of such extreme importance, had escaped the attention of man for five thousand years, which is the more extraordinary, as fiorin is not the native grass of any particular country, but indigenous to the whole world, being found spontaneous in every latitude from Iceland to Indostan.

Nor is my claim limited to the discovery of the excellent qualities of this grass; I claim to have been the first that brought an indigenous vegetable of our islands from the wilds of Nature into the Agriculturist's pale; that shewed him, his attentions are not, as hitherto,

to be limited to the culture of exotics; that we have a native vegetable of our own, to which it is well worth our while to give the exclusive possession of our ground, and to retain it in that possession for years, by the extermination of its rivals: weeding out intruders, being a species of attention to which we have hitherto considered strangers alone entitled.

Whether in the rush of spontaneous vegetables with which Nature is perseveringly striving to cover our surface, there be still more, also of value, as yet undiscovered, is a question I cannot decide.

Should the ingenuity of man discover others in addition to our fiorin, I hope they will be found to possess the same hardy habits with this native friend, which enable us to carry its culture to soils and altitudes, in which the vegetables imported from other climes could not exist; and to save its produce at seasons and in weather, under which all other crops would have perished.

The aborigines of the British Isles, seem all to have had some vague notion of the value of fiorin; I have had repeated proofs given me, that the Scotch know it to be a sweet, good grass. The Welsh also claim it; and Dr. Pugh labours to prove, that the verdant meadows in

Owen Glendower's demesne, in Glamorganshire, were composed of fiorin. The native Irish are acquainted with its sweetness, and the fondness of cattle for it; and I have stated somewhere, that the Rev. Marcus M'Causland, twenty-five years ago, descanting on the value of a piece of ground he had recovered from the sea—"See," says he, "it is all fiorin grass;" and when on a visit to my friend the Bishop of Derry, in September, we discovered that the natives of the wild parts of Donegall always charged an higher price for fiorin hay, though spontaneous, than for that made of other grass.

Nor was fiorin unknown to the botanical writers of the seventeenth century. Cambden mentions the *trailing dog-grass*, which obviously must have been the *gramen caninum*, *lupinum longissimum*, of Dr. Howe. *Phytologia Britannica*, 1650.

Mr. Stonehouse seems to have been the first that noticed it. He is quoted by Ray in 1670, and it is mentioned in Fuller's Worthies, 1662. Parkinson particularly points out the great sweetness of its stolones, which, as he says, "sometimes run to twentie feet long," while Ray makes them reach twenty-four feet\*.

\* See Parkinson's *Theatrum Botanicum*, 1640; Merret's *Pinax*, 1666.

These circumstances, and many others which might have led to an *expectation* of value, were all lost upon the writers of the eighteenth century, botanical and agricultural. The latter, indeed, far from being instrumental in making the world acquainted with the great value of this grass, had the sagacity to discover our florin to be a dangerous enemy; and any little attention they bestowed upon it, was in devising means for its extermination.

Mr. A. Young abuses the *agrostis stolonifera*, under the name of *red robin*, and gives great credit to his friend Mr. Smith, for having discovered a mode of destroying it, at the expence of eighty load of chalk per acre; and yet Mr. Smith confesses the *nostrum* did not entirely succeed; and to his great astonishment, he found that in a certain stage, his sheep eat it greedily, though Mr. Young told us all sorts of cattle would starve rather than touch its herbage.

Mr. Don, in the Transactions of the Highland Society, expresses his astonishment at the luxuriance of this *agrostis*, and seems by no means pleased with Nature, for having endowed this *useless* grass with such enviable luxuriance, that might have been so much better bestowed on some other, applicable to the use of man.

Our farmers generally execrate fiorin as *couch-grass*; and the speeches at Agricultural Societies, dwell upon the sums it has cost proprietors to rid their grounds of it.

Mr. Davis (an oracle in the South of England), in his Agricultural Survey of Wiltshire, calls the *agrostis stolonifera*, the plague of the farmers in the south-west district of that county; and tells us what a nuisance it is among their wheat; yet he too admits that it occasionally makes very good hay.

A few days ago, a respectable stranger inclosed me a specimen which he had gathered in his wheat-stubble, where it was very abundant; he begged to know if it was fiorin. I dealt openly with him, assuring him that his specimen was the very *red-robin* of Mr. Young; also Mr. Davis's *plague* of the Wiltshire farmers, and the *couch-grass* of the others. I told him likewise, that it was genuine fiorin; the very grass I had been pressing on the public; and that if he chose to lay down any of his grounds with it, I should stake my credit on the result.

I confess I am not a little vain, that a discovery of which the world begins now to feel the importance, was not the result of accident, or a *lucky hit* thrown in my way by good fortune;

but the very object I was in search of, having deliberately pointed my exertions to the discovery of better winter food for our domestic cattle, than the vegetables we now cultivated afforded them, and this before I had any certainty I should succeed in the pursuit, or could form a conjecture, if lucky, what the vegetable should be.

Whether the interest at present excited by the many and curious properties of fiorin grass, will afford a sufficient excuse to the public, for the tedious detail of the circumstances that led to the discovery of it, I am incapable of judging; but the important consequences to the agriculturist, and to the nation itself, which must follow from a general introduction of fiorin, justify me to myself, for making the attempt to convince others of what I have acquired full conviction myself.

Twenty-eight or twenty-nine years ago, I exchanged a collegiate for a rural life, and soon became greatly enamoured of agricultural pursuits. I took pleasure in applying my early knowledge of natural history to the particular branch I was now cultivating. I soon perceived that the chief desideratum in rural economy, was food for our domestic cattle through the winter; I therefore paid great

attention to the subject, making numerous experiments, and studying the natural history of every vegetable applied to their sustenance.

Some of these, as lucerne and sainfoin, I found to belong to milder climes, at least not to suit the North of Ireland. Others had their convenience, but were of little importance, and my pursuit ended in limiting myself to the *rutabaga*, from which alone I derived any great assistance.

Not one of these vegetables were indigenous to our islands ; all imported from foreign countries, where they had been found to be held in estimation.

I now determined to take a new line, to study our indigenous vegetables with care, and to try whether from any of them, I could derive new sources of maintenance for our cattle ; and for some years making many experiments on the different varieties of grass, discovered with astonishment, that the *gramina* were little understood by agricultural writers, and little attended to by practical farmers ; nor could I derive the slightest assistance from botanical books, the Linnæan school directing their whole force to *classification* and *nomenclature*, not seeming to consider the habits, properties, and uses of

vegetables, as deserving the slightest attention\*.

While I was thus amusing myself, about eight years ago, I paid a visit to my friend the Earl of Meath, a zealous agriculturist; our common pursuit frequently gave the turn to our conversation: the topics I have mentioned above,

\* I am not the only person who complains of the neglected state of that branch of botanical learning, comprehending the *gramina*.

I shall take the liberty of quoting a passage from White's Natural History of Selborne, transmitted to me by my spirited pupil Mr. Young, of Harbourne, who, I answer for it, will soon contribute largely to the supply of Edinburgh market with fiorin hay, from the moory tracts on the western termination of the Pentland Hills. The work is already commenced with much spirit.

Mr. White says, " But of all sorts of vegetation, the grasses seem to be most neglected; neither the farmer nor the grazier seem to distinguish the annual from the perennial, the hardy from the tender, the succulent and nutritious from the dry and juiceless.

" The study of grasses would be of great consequence to a northerly and grazing kingdom. The botanist who could improve the sward of the district where he lived, would be an useful member of society: to raise a thick turf on a naked soil, would be worth volumes of systematic knowledge, and he would be the best commonwealthsman, who could occasion the growth of two blades of grass where only one grows now."

It will appear before I conclude, that I shall not be content with less than treble produce.

were often dwelled upon ; and before I left Kilruddery, his Lordship persuaded me to lay off the *gramina*, as a distinct department for myself, and to pursue it with the utmost vigour.

I immediately published a little Essay on the subject, entitled, *An Elementary Treatise on the Indigenous Grasses of Ireland*. I addressed it to the Earl of Meath, claiming his Lordship's promise of assistance ; I invited co-operation from every quarter, stated what I already knew on the subject, and the mode by which I meant to proceed for the purpose of obtaining further information.

I should not have dwelled so much on this little Essay, which I published in the year 1805, was it not for a particular passage in it, which may now, when so much attention is brought upon fiorin grass, be considered as a matter of curiosity.

I say in that Essay, "There is also a grass which grows in our own low grounds, that I have heard some farmers talk of with much delight ; they call it *fiorin* or *fioreen grass*. I have taken pains to procure some plants of it, but have not yet succeeded\*."

\* I have been often called upon for the etymology of the word *fiorin*—I know it not ; both Irish and Welsh

After inquiring of different people, I at length found a tenant who said he knew the grass; I went with him to my bog, where he showed it to me in abundance. We raised nine roots, which had all long strings (stolones) issuing from them; these I cut off from eight of the roots as I planted them in a plot; but the strings of the central one, I left at full length (more than a yard), and supported them with sticks, in a perpendicular posture.

This was late in March, the strings apparently dry hay; but when the season brought vegetation into action, every joint emitted a bud, young green stolones began to hang pendulous, numerous panicles also came out, the whole mass exhibiting a beautiful appearance, from the contrast between the dry hay and the rich verdant festoons hanging down from the brown stalks. Late in July, I went to my bathing lodge at Portrush, and as my meadow was mowing, August 1st, observed what seemed ex-

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have expended much ingenuity in explaining the term, and in investigating its derivation.

When I first used the word *florin*, I endeavoured to express the sound by the letters that seemed to me to answer best; little suspecting the word would become a subject of serious discussion.

traordinary to me, that the greater part of the crop was composed of *stalks without panicles*; and also that this new production came from fiorin roots.

My scientific friends, Sir Humphrey Davy, and Mr. Greenough, were then on a visit with me; I brought them to my meadow, and consulted them on the subject of this mass of *culmi* without panicles, so new to myself. They too had not noticed any thing like it before, and the result of our consultation was, that I should leave some patches of the meadow *uncut*, and await the issue. I did so, the stalks continuing to vegetate, fell flat, yet so increased their length, that when I mowed them previous to my departure, October 1st, the sward was double the amount of the August produce.

On my return to Clonfele, I went to the bunch of fiorin I had tied up, and found the pendulous stolones had reached the ground in great numbers, and were running along it, taking root at their joints; the remaining eight roots had emitted stolones in vast quantities, and of great length, which had formed a thick mat over the whole surface; that some other plots I had laid down with fiorin, had also covered the ground with a thick fleece, were advancing beyond the bounds of their own plot,

and occupying the surface every where round it. My curiosity was now much excited, but I had ascertained only two properties of these extraordinary stolones the first year; namely, that their vegetation continued through a long period, and was in vigour to a much later season than any other vegetable with which I was acquainted; and also that the mass of their produce far exceeded that of any other grass, while its quality remained to be determined by future experiments; as a preparation for which, on the 15th of November, after a crop of potatoes, I laid down a rood with fiorin in different ways, every one of which succeeded\*.

Early in the ensuing season, I began to lay down plots of fiorin on the description of ground where I had first found it, that is, wet and miry, and always with success; I deferred mowing my Portrush meadows for a month longer than usual, and found both the quantity of crop much increased, and the quality greatly improved; the fiorin stolones, which formed so

\* I mowed the *sixth* crop from the greater part of this rood in this present October, 1812; all very fine. I leave a patch standing, to satisfy the curious, that fiorin can bear being mowed for many years successively; the field is light, dry, upland ground, and got a very weak top-dressing every year; always turf mold with a little ashes.

much of it, being now consolidated, while formerly they had been cut in too tender a state, and had therefore been always very difficult to save\*.

October 1807, I found my rood at Clonfecle in full crop; I consumed much of it as green soil, and was happy to find all my cattle showing a strong predilection for it.

The part I reserved for hay, I had determined to mow very late, and was thrown much later by an unusually wet season. This was a fortunate circumstance, for the continuance of rain gave me an opportunity of discovering, that constant deluges did not in the least injure my hay; whence I was tempted to make a bold experiment. I sunk a large parcel at the bottom of my pond, the day after it was mowed; I kept it down with great stones for thirteen

\* For many years this fact had much embarrassed me; my hay always heated, and my cocks were obliged to be thrown down more than once; my horses fell away upon it, and when I attempted to leave any over for next year, it always became fusty. But now that I never mow before September 11th, and only so early because I leave Portrush October 1st, my hay is easily saved, and my cattle thrive: I fill my lofts in September, and am sure of finding excellent hay when I return in July. All this is easily accounted for; my hay *formerly* was made up of young tender stolones, which *now* have time to consolidate.

days, then made it into hay with ease, and could not discover any difference when saved, between it and the hay cut at the same time, and saved in the common way.

This, and some other circumstances, gave me reason to suspect, that these singular stolones were *animated*; that the principle of life, destroyed by the scythe in other grasses, was retained in the fiorin strings. I called in the aid of my friend and neighbour General Trotter, Commandant of Charlmont Fort, to assist me in ascertaining this curious point: for five months, every second or third Monday, we carried fiorin stolones from my hay-loft, and also from my little stack in the field, laying them on the surface of pots in my hot-house, and lightly covering them, when we found that, though to all appearance like other dry hay, yet they always vegetated for four months; in the fifth, the principle of life began to lose its powers, and in the sixth was totally extinguished.

The predilection of all cattle for dry fiorin hay, even for that so long submerged, was now ascertained in the presence of all who came to my house, each of them trying their own horses, who all refused the common hay, after having once tasted fiorin.

I soon became anxious to know to what extent fiorin culture might be carried, and in what varieties of soil this grass would be productive; this was a business of very little difficulty, for being a grass spontaneous in our climate, it was likely to show of itself what soils it preferred.

I now discovered that fiorin was the natural production of all soils; that the extremes of wet and drought neither affected its existence nor its health; I raised excellent meadows on miry bog, so wet, that I described it in Ovid's words—*Instabilis terra innabilis unda*. Nor was the other extreme neglected, for I both sought for spontaneous fiorin on dry sandy grounds, and tried to cultivate it on the most parched soils I could command. I always found it growing, and projecting its stolones on the former description, and having planted a fiorin root on the top of my garden wall, left it untouched and unapproached for five years, during which time, though watered only by the rain that fell, it never seemed to lose its health, dropping its stolones every season, which, though battered to their destruction by the winds, against the wall, a fresh succession always issued the next year.

Relying on the power of this grass to sus-

tain drought, at this moment, at the request of some extensive proprietors in the Hebrides, and in communication with my friend the Laird of Staffa, fiorin is planting, under my direction, on the barren and drifting sands in those islands, where so much desolation has been occasioned by the facility with which this loose material is raised by the wind, and carried over better grounds, to their great injury, and often total destruction.

An acute observer, Mr. Brown, meeting with some of my papers describing fiorin, and suspecting it to be the same grass he sometimes found growing on these dreary wastes, and actually contributing occasionally to hold down the sands, sent me some specimens of it, and requested my opinion and advice on the subject.

I immediately recognised the fiorin, gave my advice as to the mode of cultivating it in that ungenial soil, and have sanguine hopes, that if my directions be implicitly followed (as is generally the case in Scotland), not only the immediate object of holding down the sands will be attained, but valuable crops of hay produced on land, not only useless, but a great nuisance to its neighbours.

I discovered also, that notwithstanding fiorin was able to sustain such extreme drought, yet

that it was fostered by irrigation more than any other grass; and I have no doubt that the softness, and inferior quality of hay from *water-meadows*, is owing to the mixture of young and tender fiorin stolones, which, if allowed to attain their full growth, and to consolidate, would produce treble crops, and of far superior quality. This topic being of great importance, I printed a small Essay on the subject, which I distributed among friends.

Curious and new matter occurred when I was in Edinburgh last spring, on the subject of irrigation, a branch not in the least understood.

I was amused at finding fiorin agreed as well with salt as with fresh water, and I laboured to persuade a Nobleman well circumstanced for the purpose, to irrigate with sea water, but I could not succeed.

An extensive field remained, to which my attention was soon directed—I mean *mountain*; I first endeavoured to ascertain to what altitudes spontaneous fiorin might be traced, and I soon found that elevation above the level of the sea, was a matter of indifference to this hardy grass, which seemed to thrive equally in Alpine climates, and in the lowest and most sheltered situations.

I have enumerated the several mountains whose gorges and summits I have explored, always finding fiorin spontaneous and healthy\*.

Reasoning upon these data, and concluding that wherever a vegetable throve spontaneously, it might also be cultivated, I persuaded the Marquis of Abercorn to permit me to make the experiment far up, on his peaty mountain Lurgabeg, whence his Lordship had cut turf seven feet deep; complete success was the result, and I have the authority of his people (his Lordship was then in England) for saying, that the luxuriance of fiorin on the top of the mountain and bottom of the valley, was equal.

The same experiment was since tried on a greater scale, and at an elevation of nine hundred feet; at this great height, the Marquis of Hertford was so good as to inclose seven acres for me, which were all laid down with fiorin under my directions, and now exhibit a magnificent crop, inviting inspection; and I hear we

† The Earl of Selkirk was so good as, at my request, to go to the summit of Knock Laid, the highest mountain in the northern part of Antrim, where he found fiorin in abundance, as I myself had the year before. Mr. Dickenson too, sent me a fiorin stole, which he found far upon Dartmoor mountain, in Devonshire.



shall soon have a report of it published by the Vice-President of the Cork Institution, who made a long journey to see it\*.

During the time I was thus endeavouring to ascertain the extent to which fiorin culture might be carried, I was equally diligent in trying the various modes in which it might be applied to use in rural economy. I soon discovered that either dry or green fiorin enriched the milk of the cows fed upon it, more than any other food I had ever tried, and that its fattening powers far exceeded those of any other hay; that as a green food, its value was in-

\* Since the above was written, I received a letter from Mr. Kennedy, who conducts the Marquis's agricultural improvements, exulting in the great crop of his fiorin meadow, and requesting permission to mow it somewhat earlier than I had allowed, expressing his apprehension, that it might be difficult to save the hay at a late period in that cold climate. I laughed at his fears, well knowing in that airy situation the hay would be saved more readily than if much lower, and at one third of the expence incurred by making common hay in July; but as Mr. Kennedy had always adhered to my directions with a precision I have been little used to, I chose to gratify him, and gave him permission to commence mowing October 1st, when my wish was, that it should have been deferred until November. Mr. Kennedy has since written to me, that three weeks of continued rain, had not in the least damaged his sap-cocks.

calculable, coming in aid of the soiling system early in September, and continuing a most luxuriant and succulent food, even until the middle of May.

I discovered also, that in an intermediate state between green soil and dry hay (that is, from one to four weeks cut), it might be applied to use most advantageously. I must admit, I also discovered, that fiorin could not, under any circumstances, be used as a pasture grass, being fit for consumption only through the scythe.

Such is the detail of the original discovery of fiorin grass, and the subsequent steps by which I acquired the knowledge of its inestimable properties. As they gradually opened upon me, I gave them to the world, requesting others to aid me in developing the qualities of an indigenous vegetable of our own climate. I believe the first spontaneous production of Nature in these islands, that has ever been brought within the pale of cultivation.

I expected co-operation, but met with opposition; I soon found that I had raised an host of enemies against me; that agriculturists could not bear to be told, that a plant perpetually before their eyes, possessed a variety of valuable qualities, which had all escaped their sagacity. Hence open war was declared against fiorin,

and against me ; from its obtrusiveness, my protégé was pronounced to be a *weed* ; and from its luxuriance (of which we now know so well how to avail ourselves) a most mischevious one. My own sanity was called in question ; I was attacked from all quarters, and while my fiorin was only gaining ground by inches, I had as many battles to fight in support of this native vegetable, as Henry the Fourth had to engage in for the recovery of his hereditary kingdom.

In the mean time, I did not neglect the remainder of the department which, in conjunction with the Earl of Meath, I had laid off for myself ; nor was fiorin the only indigenous vegetable I rescued from obscurity. For several years, I had before me numerous plots, in which I cultivated distinetly, every grass I had either heard or read of ; or that in my diligent researches had attracted my notice, by any promise of value.

The result of my experiments, carefully pursued for so many years, I gave to the public in the Transactions of the Royal Irish Academy for the year 1809, in a memoir on the subject of the useful grasses. I there detailed my mode of proceeding in investigating their respective habits and properties ; and unwilling to distract the attention of agriculturists, by laying before

them a variety of grasses, in which they had no interest, I limited my catalogue to those which I myself judged valuable, and to those spoken favourably of by others, from whom I differed in opinion, stating my reasons for recommending the former, and rejecting the latter.

In my early experiments, previous to my communication with the Earl of Meath, I had noticed the cocksfoot (*dactylis glomerata*) to possess many striking good qualities; when therefore, I published my Elementary Treatise on the Indigenous Grasses of Ireland, I brought forward the cocksfoot with much diffidence, in these words: "Were I to follow my own judgment alone, I should have put this grass in the first class; but as others do not think so lightly of it as I do, and as I have only watched it with attention, never making hay of it separately, I have not data sufficient to enable me to pronounce so positively in its favour."

Four years afterwards, having repeated my experiments on cocksfoot frequently in the interval, and often made up its distinct crop into hay, I acquired confidence in its value, and boldly assign it the second place among the *gramina*, putting cocksfoot immediately next to fiorin, by far the most valuable of all. I justify myself as follows: "By placing our

common cocksfoot so high in rank, I shall excite surprise, for though this grass be mentioned respectfully by some writers, yet I do not recollect any of them that recommends its cultivation, nor did I ever hear of its being sown for use; I do not even find its name in any of the random mixtures that agricultural book-makers are so fond of giving us."

I then proceed to the natural history and habits of the cocksfoot. I know this grass is now getting into fashion, particularly in Norfolk, where it is cultivated on a great scale by an eminent agriculturist in that county.

Whether these different publications of mine have contributed to advance cocksfoot to its present celebrity, I have no means of judging; my second Essay brought the attention of a Noble Duke to the subject, who did me the honour of writing to me about it. The claim to the credit of having brought notice upon this grass, seems merely a question of date; if any other person has recommended it to the agricultural world before me, his claim will establish itself; I can go no farther back than the two Essays I have quoted.

Whether Nature has other plants of value in store for us, that have hitherto escaped the attention of man, and whether his sagacity will

be successfully directed to the discovery of them, are questions which time alone can decide ; should he succeed and enrich the agricultural world by the discovery of other valuable vegetables of our own, I hope the contrast will still be preserved, which subsists so strongly between the indigenous plant I have brought forward, and the whole mass of those imported from foreign climates, upon which the labour of the agriculturist is now exclusively employed.

Those extraneous plants soon show they are not the hardy natives of our own climate ; they are subject to disorders, and harassed by enemies of their own—the turnip is pursued by its fly ; the wheat is often blighted, and, as my friend Sir Joseph Banks proves, by a parasitic fungus peculiar to itself—the *smut* is probably occasioned by an hostile insect ; our more recent acquaintance the potatoe, is a most tender vegetable, subject to other disorders as well as the *curl* ; and all these imported vegetables are liable to great injury from the severity of weather in a climate not their own ; frosts nip them when in a tender state, and in a more advanced stage, storms shake out their grain ; deluges of rain lay them flat, and then their grain ceases to fill.

The harshness of our climate is more severely

felt when we come to save our crops, which are often damaged, and sometimes lost, in late and wet seasons, all which calamities they escape in their native soil ; a genial sun bringing them forward so early, that they are cut and saved in the height of summer.

See the contrast—our native fiorin has no disorders, no enemies ; the vicissitudes of season make no impression upon it ; and this hardy grass vegetates in the severest frost ; its stolones continue to lengthen under the snow ; deluges of rain do not in the least injure it ; and if Nature has thrown its period of perfection into the winter season, she has had the kindness amply to compensate, by making both the plant and its enormous crop, equally insensible to the severities attendant on the season. And though we cannot accumulate a fiorin crop in the short and moist days of the brumal months, we can consume it to the greatest advantage in that period ; and should we mow more than we can use, we know that fiorin grass will remain on the ground without injury, until the lengthening day brings sufficient drought to enable us to convert into excellent hay, both what was cut, and what was left uncut through the winter.

The moment in which this grass, with its valuable and accommodating qualities, was disco-

vered, proves a most critical one. Our grain crops, found for a succession of years to be totally inadequate to the sustenance of our population; famine pinching, and strong symptoms of the insubordination usually attendant on it appearing; our bullion exported for the purchase of grain, and insufficient for the purpose.

I shall take the liberty of quoting a passage from a letter of my respectable friend Patrick Miller, Esq. Dalswinton, dated September 11th, 1812; dwelling on this topic, he says, "he must be very ignorant who does not perceive this, more especially at such a period, and in a season of scarcity."

"Your introduction of fiorin will soon make us independent of other countries for food, and it will preserve our bullion more effectually than all the plans yet proposed by statesmen and others."

My venerable friend is a personage who has for more than half a century been in the habit of laying before the world, many proofs of his vigorous acumen; his penetrating eye soon saw the immense advantage that must follow from the introduction of fiorin grass, should my statements be well founded. After some communication with me, he sent over his land-steward to Clonfecla, to satisfy himself of the

truth of my positions, and to learn the mode of laying down, and cultivating this extraordinary grass.

The missionary soon satisfied himself, and also Mr. Miller, who commenced fiorin culture with great spirit and success; and in a short time perceiving the immense benefit he was deriving from it, exults to the world and to me, in the prodigious improvement his estate is receiving from it, and redoubles his efforts.

I shall give his own account of the present state of his fiorin crops, and the rapid advances he is making; of which I myself could form a good judgment, having examined them when visiting my friend, both in October and in April last. Mr. Miller says, "as you may wish to know how I have proceeded in my fiorin cultivation since I saw you, I have to inform you, that I have laid down twelve acres, I think very properly; and I intend in five or six week hence, to lay down eight or nine acres more after potatoes, so that I shall then have thirty-six acres laid down about my house."

Mr. Miller describes the wretched state in which he found thirty acres of these, contiguous to his house, when he purchased Dalswinton estate. "In that state, they remained a good many years, and now I would not give a lease

of them for nineteen years, under 20*l.* sterling per annum for the English acre. Upon my remote farm, I have been laying down, and intend to lay down, as much as I can overtake; I have fifty acres of fine potatoes well manured."

What Mr. Miller calls his remote farm, is a mountain moor, just out of lease when fiorin was discovered; it had been let for nineteen years at one shilling per acre; and when advertised again, no more was offered, and my friend determined to dedicate it to fiorin. When I was at Dalswinton in October, I found two or three acres of this moor in full fiorin crop, and much more proceeding on.

My friend's general position of the great benefits that will necessarily follow the introduction of fiorin grass, may seem extravagant at first sight, but probably upon examination, will appear not ill founded. I shall therefore venture now to speculate on the effect it is likely to have on three descriptions of persons, or rather grounds; upon the first and second of which, it must necessarily act powerfully and rapidly; on the third also, its effect will be felt in time, but its progress will probably be slow and gradual. I place my friend Mr. Miller at the head of the first description, comprehending those

who possess boggy and moory grounds contiguous to their farms or demesnes.

The discovery of the facility with which these *now* unprofitable wastes may be made, at small expence, to produce crops of the highest value, will no doubt bring many of their proprietors into action; superabundance of hay will be the immediate result; what then becomes of the ancient meadows that have hitherto supplied Mr. Miller, and the gentlemen of this description with hay? must they not be instantly converted into tillage grounds? and with the advantage of a profusion of manure, derived from the cattle fed from meadows which never require animal dung, ashes from the spot answering the same purpose. The immense addition to our grain crops that will arise from this source, must be obvious to every one, who has travelled through Ireland, Scotland, and more particularly the North of England.

The next description comprehends the extensive grazing farms scattered through the mountain districts of our islands; the cattle fed upon these bleak pastures through the summer, are at present sold off, or sent elsewhere to find sustenance through the winter.

But now since we became acquainted with this hardy vegetable, we know that we can

make fiorin meadows on the cheapest terms, and to any extent, through every part of these dreary regions, which will not again be depopulated in winter, their cattle finding food within their own limits, in greater abundance in winter than in summer ; and administered to them with the greatest facility, as will appear in the Report laid before the Farming Society, of the Tour they did me the honour of requesting me to make through the Wicklow Mountains this last summer.

On communication with my friend and conductor Mr. Critchley, it appeared that these meadows were not to be made so far up on our mountains, as the hardy fiorin would bear to be cultivated ; that the convenience of attendance must be taken into consideration, of course that meadow in each mountain farm must be made as near as possible to the confines of the inhabited country.

Let us now assume, that in each farm the simple sheds I recommended are actually constructed, and the numerous herds of cattle no longer sent off, but fed in them plentifully through the winter ; the necessary result is an immense accumulation of dung. Let us see how it will be disposed of—not in fertilizing the meadows which produced the hay: *that*, as I have

clearly shown, being always done with great facility by ashes, from burning the contiguous moory soil ; or by irrigation from the commanding rills ; of one or the other of which we are always secure ; for requiring but comparatively small patches of meadow, we have an option of them, and will in our choice probably be governed by these very circumstances. Will not then our dung, accumulated in vast quantities near the confines of the mountain and lowland districts, find its way to *both*, and not being required for our meadows, will be employed in raising food for man? What descends to the lowland regions, will increase the number, and improve the quality of their grain crops ; and what is retained above, will no doubt be applied to the improvement of the skirts of the mountains, which will be gradually advanced upon to great extent, and be brought into tillage, commencing with the potatoe, the precursor of grain crops.

Thus it appears, that all this dung will be employed in raising food for man ; of the quantity we can form some judgment, by considering the immense numbers of store cattle crowding our roads leading to Donaghadee in autumn, or by examining the Custom-house books of that port. These cattle are mostly lean, or at

best but half fed ; and not one of them would leave their own mountains for another year, could a cheap and easy maintenance be found for them there.

The quantity of additional food for man, by which our present stock will necessarily be increased, by a general introduction of florin culture into our mountain grazing farms, must be proportionate to the number of these farms ; to ascertain that with precision, would be difficult, perhaps impossible ; but whoever looks to the extensive mountain tracts scattered over the British islands, must admit their number to be immense, and of course the acquisition of food for man, enormous, should the measures I recommend be generally adopted.

The objections usually started against all plans for improvement of great magnitude, and extensive operation, are,

1st, That they induce immense expence.

2d, That they require a long time to carry them into execution.

3d, That they call for exertions not easily commanded.

Of all these objections, not one holds good against the improvement of either of the descriptions of ground I have been treating of: as to the first, I have repeatedly shown peaty

moor to be convertible into rich fiorin meadow, at a most trifling expence, bearing no proportion to the immense profit quickly derived from them, and often falling short of the value of the first crop; the amount of which is all I demand from my friend Lieutenant-General Sir James Stewart, for the reclaiming of his great moory bog at Camnethan, thirty acres of which, I am just informed by our common friend Mr. Anslie, are already laid down.

When the Marquis of Hertford formed a fiorin meadow of seven acres far up in his mountain, I engaged to cover the whole expence (bating enclosure) by the value of two crops; one is already mowed, and although some untoward circumstances increased the expence, I have no doubt but that I shall fulfil my engagement.

A few days ago I laid off a meadow for my friend and neighbour the Earl of Caledon: the soil poor cut out moss; and I engage that the first crop shall pay the whole expence, and that it shall be mowed in eleven months.

Previous to my laying off the Earl of Caledon's, and Sir James Stewart's meadows, the grounds had been examined in the presence of each of the proprietors, and deliberately pro-

nounced to be incapable of any other culture, and literally worth nothing.

The Marquis of Hertford's meadow, previous to my communication with his Lordship on the subject, had been valued by his agent at five shillings per acre ; it thus appears great expence is not incurred on the improvement of such wastes ; nor is much time required, as in a Memoir addressed to the Farming Society of Ireland (for which they honoured me with an elegant gold medal), I promised early in April 1811, that the ground from which I should cut my turf when I returned home, would then be prepared and laid down with fiorin ; and that I engaged in the same year to mow from it a crop of hay double the value of any in Britain, not fiorin.

I performed my promise, and fulfilled my engagement to its greatest extent ; for this meadow being mowed late in October 1811, in the presence of Sir James Stewart, the Members of Committees sent from the Scotch Agricultural Societies, and several other Gentlemen, they all declared, and I know would certify, that the crop appeared to be treble the amount of any they had ever seen mowed before. The fiorin strings that produced this

crop, were laid down April 24th; and I have a still stronger instance of the rapidity with which this luxuriant grass may be hurried into a most productive state.

On the 13th of May, 1812, my friend Mr. Baird, of Shott's Iron Works, near Glasgow, laid down a field with fiorin strings, I teaching his docile people the mode, and laying down the first stolones myself: now Mr. Baird writes to me, that he is secure of a magnificent crop of hay this same season; and exults in his success with much gratitude\*. Length of time then is not required to carry our measures into execution.

Great exertions no doubt would be necessary to extend improvement over our immeasurable waste tracts all at once, and it will probably be suggested, that a measure of such magnitude, and pregnant with such beneficial consequences to the nation, should be taken up by Parlia-

\* Mr. Baird continues highly satisfied with the result of his fiorin crops; and in a communication to the Editor of the Farmer's Magazine for May 1813, among other advantages of this grass, he states that his cows, for a month they were fed on fiorin hay, *gave one-third more butter from the same quantity of milk, than they did either before or afterwards upon their usual food.*

ment, and that the public purse should bear much of the expence of a measure, which necessarily must increase the wealth, strength, and prosperity of the nation.

Upon public assistance I certainly do rely ; but not in a pecuniary view : great exertions no doubt are necessary ; those I trust will soon be found, and completely within the powers of the agent we shall call into action, the mass of the people.

Let us assign to each individual that will enjoy a share, and derive benefit from florin improvement, his diminutive portion ; let him commence with the three or four acres, that, under our plan, will be sufficient for his own purpose, and the whole business will be executed in one year ; in that short time we shall see florin meadows scattered through our mountains, from Caithness to Kendal, and from Fair-head to Cape Clear. We shall see at the same time the periphery of every barren peaty moor encroached upon, and the verdant meadows pressing every where on the russet heath ; the recurrence of famine will then be made impossible, and the only dread that can attend an inclement season, will be, that of being obliged for a short time to prohibit the exportation of corn ; the quantities

derived from our new sources, being abundantly sufficient to cover our own consumption under every possible failure.

All this I know will be pronounced *Utopian*, and I shall be laughed at for surmounting every difficulty by one stride. I am well aware, that the difficulties I have so rapidly got over in theory, will in practice be found very great, and so formidable, as to require long time and great patience to surmount them. Let us see what they are, and whence they arise. Not from Nature, she has thrown no difficulties in our way ; that floricin will thrive luxuriantly, and produce magnificent crops of hay, in every situation I have pointed out, are all positions of fact, all repeatedly established ; Nature then has done her part, and smoothed the way for us ; it rests with man to proceed.

It is *here* the obstacles begin to appear, and the difficulties to be surmounted show themselves ; they are numerous and formidable. We have to encounter inveterate prejudices ; to subdue a rooted aversion to innovation ; to alter practices long established ; to adopt new measures in a favourite line (agriculture) ; and what will perhaps be the most difficult of all, we must oblige gentlemen to retract (virtually) the position they have so long warmly maintained ; to

wit, that fiorin was a vile weed, which they had incurred much expence in extirpating.

These are the difficulties that arrest the progress of fiorin culture, in the third, by far the most important of the three descriptions of ground, into which I have divided our whole agricultural territories, improved and unimproved—I mean the cultivated farms spread over the whole face of our islands. I do not suggest any alteration in the present mode of cropping these farms; I respect the skill with which agricultural business is carried on; I am aware of the many improvements that have been successively adopted, and most of all, the new style of rotation crops, which has turned out to be so advantageous.

My interference is the simplest that can be conceived: a certain commodity, hay, is indispensably necessary to the farmer; I propose to supply him with *better* hay than he has hitherto ever had, at *one third* of the price; or which is tantamount, to make one acre produce what three did before. Whether I am able to do so or not, is not a matter of opinion and speculation, but a mere question of fact, which I consider as completely established; having for years called on the world to view such crops, actually growing on my own ground, and hav-

ing repeatedly laid before the public the testimonies of those that inspected, measured, and weighed ;—all persons of respectability, and many of them of rank.

Of late, too, I have been able to show, that raising treble and quadruple crops of hay from grounds of common description, is not done by any nostrum of my own ; not done by any secret I possess within my own breast ; but by a process communicable to all who wish to understand it, and actually now learned by many who cultivate fiorin as successfully as I do myself, as extensively, and who are equally anxious that the world should partake of the advantages of a discovery, from which they themselves have already derived so much benefit, and are at present speculating upon much greater profits, by rapidly extending their cultivation of fiorin, now completely understood by them.

I hope my friends, and I may say pupils, the Lord Bishop of Derry, and Mr. M'Naghten, will not take amiss, that I call the attention of the world upon them, as successful fiorin cultivators on a great scale ; the zeal each of them showed last winter in London, to impress upon others the same conviction that had induced themselves to venture so far into this new field, will I hope plead my excuse.

These respectable personages, when proceeding to attend their parliamentary duty, left their fiorin crops in high luxuriance, and anxious to know with precision their amount, ordered portions to be measured, and the dry hay to be weighed, the quantity established by regular affidavit, and transmitted to them in London.

Mr. M'Naghten's amount was six tons eight hundred weight, *dry hay*, to the English acre; that is, seven English load and two hundred; and the whole meadow, it is certified, would have averaged the same.

The Bishop's amounted to more than seven tons and a half; that is, eight load six hundred weight; this hay was weighed, and stored in November, and what his Lordship did not use himself, was sold late in spring at five pounds per ton; and where an option could be made, eagerly preferred to any other hay.

I often viewed Mr. M'Naghten's crop last year, and also his present crop, in company with different persons of the highest rank; and I boldly say, his hay will amount to one third more than it did last year. The Bishop expects to mow thirty acres of fiorin next year. There was not any expensive process adopted in laying down either of my friends' meadows.

Mr. Curwen some years ago stated a ton and

a half per acre, to be an average crop of hay in England; and Lords Rous and Redesdale were so good as at my request to make inquiries into the subject, and the result was the same to each, that two tons of good hay was a fine crop; two English load would, I believe, be admitted a fair average for good crops. My own fiorin crops have been often weighed by persons of respectability, and never came so low as seven tons dry hay to the English acre.

After this, I conceive I have a right to assume fiorin meadows to yield thrice the quantity of hay that our common meadows produce.

Availing myself of this as a postulate, I shall venture to make another assumption; to wit, that the truth of this position is established to the satisfaction of all farmers. Let us try the result on the third description of ground into which I have already divided our islands, and the most important.

Every agriculturist that has the power, finding that fiorin produces treble what his former meadows did, will no doubt recur to it in future; and if his demand for hay remains the same, will mow but one third as much ground as he did before, of course two thirds of his meadows will be applied to tillage, and increase the national stock of grain.

I shall be told, much ground in England is used as meadow, which is not applicable to tillage. No doubt, but there is not an acre of common meadow in England, which could not in one year be converted into fiorin meadow at moderate expence ; here an increase of the food for man is not the direct consequence of the change, but it operates indirectly, which to the nation is the same thing. The person so circumstanced, has the quantity of his hay trebled ; of course he feeds more cattle, which produce more dung, that soon finds its way to his farm, extends and improves his agricultural field, and of necessity must greatly increase the amount of his grain crops.

I am told, that by the common law of England, meadows and closes are prohibited from being broken up without the consent of the landlord ; and that this prohibition is introduced as a clause in many leases, and enforced by an heavy penalty. This is done, no doubt, to prevent tenants from deteriorating their land by harassing it with frequent crops, and leaving the farm without hay when the lease expires.

It will be hard if the same clause stops the improvement of the land, and prevents the tenant from leaving it productive of a *treble* quantity of hay. I shall propose a composition

between landlord and tenant ; let the former permit his meadow to be broken up, upon condition that it be planted with a crop of potatoes, and then laid down with fiorin ; thus the landlord preserves his ground in meadow, and trebles its value. Perhaps the legislature may interfere, and not suffer the improvement of the country to be arrested, when circumstances are so altered, as to make the prohibition not only unnecessary, but a nuisance.

I shall now suppose the landlord to be obstinate, and that the legislature will not interfere ; fiorin can still make its own way. The tenant has only to weed out in May and June, cursorily, such early grasses as show themselves by their panicles, not to be fiorin, and to abstain from mowing until November : at the end of the second year, he will find a tolerable fiorin crop, and the third November, a good and nearly an exclusive one, more especially if the ground be cold and moist, well drained and manured.

I am aware I am straining my credit, but I must recur to my usual style of demonstration—*come and see*. Three-fourths of my Portrush meadow was never broken up, yet the whole is a uniform and nearly an exclusive fiorin

meadow, sold as such, and greatly coveted by my neighbours, who are ready to give any price for the excess above my own consumption.

At Clonflecle the case is different ; here my longer residence gives me greater command, and I chuse to lay down my fiorin meadows *directly*, and by the common process. The English repeatedly complain to me that they cannot be sure they have the right species of fiorin : I now give them an opportunity of calling in Nature to aid them in selecting the proper species ; for though there be different varieties of *agrostis*, and some other stoloniferous grasses, I answer for it, that Nature chooses the best, and that it will be our own fiorin that secures the possession, by smothering its rivals with its close suffocating mat.

Let us look coolly on this novel practice I recommend, and when we attend to the uniform process of Nature, it will be found not so extraordinary. Nature shows an irresistible propensity to clothe our whole surface with an infinite variety of vegetables of her own choosing. Man likes to select for himself, and to occupy his portion of the surface, with some one vegetable exclusively of which he can avail himself. Hence

agriculture may be defined, a *contest between Man and Nature for the possession of our surface.*

In the brisk operation of one season, when he chuses an annual, man always succeeds, and exterminating rivals, holds his favourite in exclusive possession, though not without some struggle. When he chooses a perennial, the case is different; the rush of a motley mixture of vegetables when Nature gets time, is irresistible; he may weed and exterminate, but in vain; the heterogeneous mixture occupies the surface, ousting the favourite in two or three years, or leaving him but a scanty share of the possession. With perennial fiorin the case is different; I know not any other vegetable that lends its aid to man, and assists him in subduing its rivals; for while in May and June we extirpate the strong and prominent intruders, in September and October the fiorin exterminates its more diminutive competitors and nascent enemies, by spreading a thick suffocating mat over them.

The difference then between this and the common method of obtaining exclusive crops of any vegetable, is, that instead of sowing or planting fiorin ourselves, we rely upon Nature for making it a part of her mixture, secure she

will not fail us, and then by availing ourselves of the habits of our favourite, and warring against its rivals, we soon bring it into exclusive possession, as I have repeatedly done.

Let us return to Mr. Miller's speculation—"That the introduction of fiorin will soon make us independent of other countries for food, and will preserve our bullion." In support of my friend's opinion, I have laid down two positions as premises. The first, that fiorin grass will produce steadily hay crops more than treble the amount of what we now mow from the same extent of ground.

I have this day received a letter from a spirited Middlesex\* fiorin amateur, from which I shall take the liberty of making an extract. My Correspondent thinks he makes a great concession, when he admits a crop of fiorin to amount to four load per acre, and even so draws most important consequences from that amount: he says, "We have in our parish of Willesdon, about 4000 acres of meadow land, which, on an average of seven years, produce not more than 6000 load of hay; allow that it would not produce more than four load of fiorin per acre; 1500 acres would be fully adequate to produce as much as the whole now produces; there

\* Samuel Drury, Esq. of Willesdon.

then would be 2500 acres for wheat, and other crops ; viz. turnips, beans, clover, all of which would find a good market in the metropolis ; what wonderful benefits would arise to the public at large, as well as to the landlord and tenant."

My Correspondent reasons well, but he must alter his premises : what will my friends, the Lord Bishop of Derry, Mr. M'Naghten, and Mr. Miller, of Dalswinton, say to his average of four load at 1800lb. to the acre ? The lowest amount of an acre of fiorin I ever knew weighed, was Mr. M'Naghten's, which came to seven load 200lb ; and I answer for it, that it reaches nine load this season.

The Bishop's and my own far passed eight load last year. I do not know whether ever Mr. Miller weighed, but we may guess the amount was great, when he values his meadow at 20*l.* per English acre : these gentlemen, all of high respectability, possess too much honour to suffer me to mislead the world in their names.

The second position is, that a conviction of the great value of fiorin is fully established. The former position has been repeatedly proved, and admits demonstration as often as called for.

The second I shall for a moment assume to be true. Let us try the result, and see what

effect is likely to be produced on the third description of territory into which I have supposed our islands to be divided ; to wit, the mass of cultivated farms spread over England and Wales, stated to amount to 11,500,000 acres of arable, and 6,000,000 acres of meadow. Vast quantities of these meadows must rapidly be laid down with a new grass, admitted to produce treble as much hay as is afforded by the grasses now clothing our present meadows ; and vast quantities of them must be applied to tillage, the proprietors being supplied with better and more abundant hay from one-third of the same ground. How much the eleven one-half million acres of arable will be augmented by this transfer, and how far the six million acres of meadow will be reduced, are questions to be answered only by conjecture.

I am sure I make great concessions, if I admit one-third of our meadows to remain in their present state, after the proprietor is convinced that he has it in his power to treble their crops, and that one-third only is laid down with clover. We add then two million acres (the other third) to our tillage ground, and we increase our hay crop by one-third. Our tillage ground, 11,500,000 acres at present, is increased by more than one-sixth ; we can now throw some

light on the subject, limiting ourselves to wheat. Other crops applicable to the food of man will no doubt be also raised; but I do not take these into consideration, leaving them out to make my general conclusion more secure.

Mr. M'Pherson makes the average produce of wheat in England and Wales 8,000,000 quarters; let us suppose the same proportion to hold in the two million acres we have added to our tillage ground, and we add annually to our present produce of wheat one-sixth, that is, 1,333,333 quarters of wheat. The average importation before 1797, was 400,000 quarters for some years; in 1799, 415,647; in 1800, it was 1,174,654 quarters; and in 1801, 1,186,236; thus it appears, that the quantity of wheat likely to be brought by the introduction of fiorin grass into general use, is more than treble the average importation for many years, and exceeds the importation in either of the two years of famine, when it rose to an height it had never approached before. I fear the importations of late have been weightier, but I have not yet received a statement of them. Whoever attends minutely to my calculations, will find I have much to spare.

Surely with the great addition I have made to our resources, we shall never be obliged to im-

port another quarter of wheat, or to send one guinea abroad for food ; no, but we shall soon resume our former enviable description—*a grain exporting country.*

Let us try the question in another point of view ; we have added two million acres to our tillage ground, and it is not unreasonable to suppose each of these produces a crop of wheat every fourth year, for the meadows we transfer to tillage are our very best ground ; dropping then (as before) all consideration of other crops, we have thus made an annual addition to our wheat crops of 500,000 acres of wheat, which at three quarters per acre, gives us a steady increase of 1,500,000 quarters, still more than the preceding amount.

The approximation of these two results, tends much to confirm the fairness of each of them.

I must observe, that although these results so completely establish my friend Mr. Miller's position, as to the effects the introduction of fiorin grass must necessarily produce ; yet they are deduced from but one of the three descriptions of ground into which I have divided our islands, viz. our present cultivated farms.

The addition that will be made to our grain crops by the cultivation of fiorin on our peaty moors, upon which I have already dwelled, is

not taken into consideration. Neither is the improvement and extension our agricultural field must derive from scattering meadows, clothed with this luxuriant grass, through all the dreary mountain tracts so profusely spread over Great Britain and Ireland, called in aid of my friend's position, "that it shall not again be necessary either to import grain, or export our bullion."

Let us try the effect of the general adoption of floric culture in another point of view. I believe it to be admitted, that the system of poor laws is considered as the greatest grievance the English sustain, and from the reports published, it appears their weight is prodigiously increased in years of scarcity.

During the year 1801, they are said to have reached ten millions, and that a contribution of 18s. in the pound had been raised; and Mr. Colquhoun mentions parishes where the rates had advanced from 20s. to 40s. in the pound.

The adoption of measures for relieving the English nation entirely from this grievous burden, lies in other hands; but the restraining the occasional enormous rise of the *poor-rates*, and keeping them at a regular standard, will be a necessary consequences of the general introduction of floric culture.

The exorbitant increase of the *poor-rates* has

been always occasioned by a great rise in the price of corn, the consequence of a scarcity ; but as similar scarcities cannot again occur, after such an addition to our grain crops as must follow an extended adoption of the culture of this valuable grass, we may fairly reckon the abatement of the pressure of the poor laws, among the important consequences resulting from the discovery of fiorin, and general introduction of this novel food for our domestic cattle.

There is another most important point of view, in which the effects produced necessarily by the introduction of fiorin may be considered; I mean their operation in maintaining and in employing our population. That the population of every one of the great constituent parts of our empire, is steadily increasing, will readily be admitted, without calling for the authentic documents by which the position can be instantly established, to wit, that in the last ten years, England alone has added one-fourteenth to her population, by an increase of 1,207,393 souls. And that the food produced by these countries for many years, has been quite insufficient to the sustenance of that population, is a truth equally certain, and will as readily be admitted.

The grand object, therefore, of modern po-

litical economists, has been to bring the population of the country and its food to a level; and much severe censure has been thrown upon Mr. Malthus, for what has been called his abominable suggestion, of bringing down the population to the level of its food; while the necessary consequence of my measure is, to bring up the food not only to the level of our population as it stands at present, but also to make it suffice for a population greatly increased, as we know ours will soon be. Nor is it our own immediate population alone we have to look to; our West India Islands cannot sustain themselves, and the increase their population has received by the addition of French and Dutch Islands and settlements, calls for far more abundant supplies than formerly.

Shall we leave the comfort, perhaps the existence, of so many thousand industrious subjects, at the mercy either of an envious and savage American populace, or what is worse, in the hands of their corrupt government, whose individuals may be bribed to withhold their supplies of grain at the very moment they are most necessary?

At this very critical period, a discovery is made; the immediate consequence of which, if we avail ourselves of it, is a rapid increase of

our stock of grain, to an amount sufficient to cover, not only our own demands, but also those of all who are dependant on us; we shall then retaliate on the Americans, not by prohibiting the importation of their grain, but by supplying the West Indies from our own resources, and thus depriving them of their best customers. Is a measure of such promise to be treated lightly? look back to the tenor of the argument by which it is supported, and it will be found to consist of two parts,—facts,—and the consequences that must follow from them if true; admitting the premises, every one can judge of the fairness of the conclusion. But who can pronounce upon the truth of the premises? (that is, the facts). Surely, none but those who have given serious attention to the subject, who have cultivated, or at least made patient experiments on the grass in question, so as to have acquired some knowledge of it, some acquaintance with its natural history, its habits, and properties.

Is this a description of those who are so ready with their decided opinions upon the folly of my speculations; and who so confidently deny that the facts I have stated are true? By no means; the enemies and opposers of florin, are a set of grave, wise gentlemen, possessing such a confi-

fidence in their own judgment, as to make it unnecessary for them to seek external information on any subject, having resources enough in their own wisdom to enable them, not only to conduct themselves upon every new question that arises, but also to instruct the world what others are to think of it. I should conceive those gentlemen would act more decently and more honourably, if, when a discovery is said to be made, and the measures recommended by which others are to avail themselves of it, they suppressed the ebullitions of their wisdom (at least for a time), leaving the projector a clear stage, and a fair opportunity to make his own way in a world as yet unprejudiced against him and his discoveries; the profound wisdom of these gentlemen might have told them, that their interference was not necessary; that if his discovery was nothing, and his schemes futile, the world would soon detect him, as they have already so often of themselves detected and ridiculed the puffed discoveries of pompous charlatans.

The introduction of fiorin grass, with the consequences I have demonstrated that must necessarily follow from it, will probably have an influence on our population in another way, and give a direction to the exertions of a great part

of it, which must, upon consideration, appear very desirable.

The whole population of England and Wales has been lately estimated at 9,343,578, of which but 1,713,289, are employed in agriculture, as appears by a return made to the House of Commons.

Is this a desirable distribution of the national force? Is not an increase of the agricultural population most earnestly to be wished for? and is not this increase a necessary consequence of carrying florin culture to the extent to which I hope it will reach, by so prodigiously increasing our tillage field, even in our best cultivated countries; and still more by the immense tract it will be the means of reclaiming in our mountains and moors?

After deducting from the mass of our population the 1,713,289 employed chiefly in agricultural pursuits, how much of the remaining 7,630,289 is employed in manufactures, I know not, but the number is too great; for when our manufactures far exceed the consumption of our own population and our dependants, we throw ourselves at the mercy of others, many of them our enemies, who, knowing well our weak point, direct their force against it, and with too much success; as it appears the interruption of the

External demand for our manufactures, throws those who are maintained by them, into such distress from the want of employment, as produces *outrage and turbulence*, bordering upon *insurrection*.

New employment for unoccupied hands, must be the immediate consequence of the extension of our agricultural field, which will follow the general introduction of florin, and perhaps prevent the recurrence of the painful scenes we have so lately witnessed.

There are many other advantages to be derived from this valuable grass, which, though neither so weighty nor so general as those I have stated, are yet of great importance, and will result directly and immediately to those who will apply florin to the uses and purposes I proceed to recommend.

Since the events in Spain, sheep and wool have absorbed much of the attention of the English landholders, and great ingenuity has been exerted in experiments, to discover by what crosses and mixture of breed, we can bring the fleece of that valuable animal to the greatest perfection; to find out how we can best avail ourselves of a novel circumstance, the introduction of an immense number of Spanish rams and ewes into this country, a traffic hi-

thereto unsuccessful, as the Spaniards have long secured to themselves the advantages of their own breeds, by denouncing and inflicting the severest penalties on those who even attempted to export these favourite animals, and so to make foreigners partakers of the immense benefits they derived from the monopoly of wool, unequalled in fineness and delicacy of pile.

I have never paid attention to this branch of rural economy, nor do I claim any knowledge of sheep, save only that like other animals they must eat. In limiting ourselves to this circumstance, the introduction of fiorin will mark an æra of much importance to the breeders and feeders of sheep, in every situation in which we find that valuable animal.

That succulent food in spring for the ewes giving milk, is at present the grand desideratum with sheep breeders, every one knows; what an acquisition then must a luxuriant fiorin meadow, cut daily as wanted, increasing the quantity and improving the quality of the milk, be at this critical period to those rearing many lambs!

In a more advanced age of the animal, I have shown the Norfolk Agricultural Society, how much better and more cheaply, by aid of fiorin, they can furnish their sheep with hay (even in

the midst of their turnip field where it grew) than they do at present.

The improvement I conceive wool will receive from the use of fiorin, I admit to be pure theory, not derived from practice or experience, but founded on common sense, and arising from observation on the natural history of animals inhabiting northern and alpine climates.

The finest furs are procured from the coldest regions; Nature wisely providing for her subjects a defence against the severities they must necessarily sustain, gives them such clothing as will most effectually protect them from cold. What animal is better furnished with fur than the sheep? and that this fur becomes finer and more delicate in the coldest parts of our islands, we have the most convincing proof, when his countrymen, anxious to procure the finest possible wool for a pair of stockings to be presented to Marshal Keith, discovered that the Highland and Shetland wool excelled all others in fineness. Then why not stock those Alpine regions more abundantly with sheep? The reason is obvious, because they do not afford them food in winter.

Why do the Spanish sheep migrate backwards and forwards from Leon, &c. to the Asturias? Because the former affords pasture in

winter, the latter in summer ; the grass in Leon is burnt up in summer, and the Asturian mountains are covered with snow in winter.

The introduction of fiorin alters the question, so far as food is concerned, and in a Report of my Tour through the Wicklow Mountains, made at request of the Farming Society of Ireland, I have shown that fiorin meadow may be made on the cheapest terms in every mountain grazing farm in Wicklow ; and of course in similar regions, and that there, sheep may be fed in the winter luxuriantly, at little expence, and in severe weather protected by sheds of little cost, in the manner I have pointed out.

What effect this novel mode of managing sheep (a free range of dry mountain always open to them, with food in abundance, and shelter at all times in their reach) will have upon the fleece, is an experiment that will soon be tried by my spirited and intelligent friends, Mr. Critchley, in Wicklow, and Mr. Young of Harbourn, on the Pentland Hills ; for each of these Gentlemen, I have laid out meadows, which I answer for it will be of most luxuriant produce, and executed on the cheapest terms\*.

\* I cannot help mentioning a circumstance that occurred, when with Mr. Young, I was laying off his mea-

By attention to the natural history of fiorin, and a watchful observation of its habits, I have discovered a use to which it may be applied, little expected, yet of some consequence. This grass bears privation of air and of the sun's rays, better than any other I am acquainted with; hence it comes, that fiorin is found in abundance on the north side of all high walls, and particularly of churches, as I have long pointed out; for being there protected from cattle, and better able to bear the privation of the animating rays of the sun than its rivals, it always obtains a greater, and indeed the principal share of the possession.

Acquainted with this fact, when called upon to know where fiorin stolones could be procured, I sometimes directed those that sought them, to raise the grass growing in contact with the north wall of their parish church, telling them they would find it to be fiorin. My advice was seldom attended to, but my friend Mr. Dickenson, Member for Somersetshire, had more confidence in me; he looked for fiorin at the north wall of his parish church at Somerton,

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dow, from which its then state may be judged of; we sprung a black heath-cock (the only one I ever saw), from the middle of our projected meadow.

and sent me a root, which after a year's cultivation produced many stolones, some of which I sent back to Mr. Dickenson.

This discovery does not open a very extensive field to us; but by an application of the same principles, we are led to a scene of greater importance and wider range—our young plantations. Here having excluded cattle, and ceased to disturb the ground, the contest for the possession of the surface by the numerous spontaneous intruders I have already mentioned, is carried on without interruption; and the fiorin, better able to bear the shade of the young trees, and the want of air, than its rivals, has, as at the north wall of the church, a far greater share of the possession than any where else.

Let those who doubt me, examine their young plantations, especially in winter, and they will find them without exception, full of healthy fiorin stolones, which will furnish strings enough to lay down their grounds to the greatest extent. Let us avail ourselves of this discovery, and when we set out a young plantation, let us consider that we are also laying down a fiorin meadow, and then scatter stolones on the surface, lightly sprinkling them

over with earth or compost, and weeding out intruders as they appear, particularly *dactylis* and *holcus lanatus*.

Whoever shall obey these directions implicitly, I answer for it, will mow a valuable fiorin meadow within a year (and for many years); that is, until the branches shall close over head, then, indeed, the fiorin will so abate of its luxuriance, as not to be worth mowing.

Are those who had laid down plantations before the discovery of this secret, precluded from having the benefit of it? By no means. Very little remains for them to do; fiorin is already in good, though divided possession; they can soon make that possession exclusive, by weeding out all other intruders as they appear, and the rival grasses, when in May and June they shew themselves by their panicles.

The winter is now commenced (written in December 1812); let those who respect my advice, instantly begin to weed their plantations, and persevere until the weeds and other grasses are exterminated; and I stake my credit, where the trees are neither too thick nor too full grown, that a good crop of fiorin is mowed next autumn, just before the leaves begin to fall. The expence of this weeding will not be very heavy

the first year, and little or nothing ever afterwards. Those who do not believe me, and therefore will not venture into practice, may amuse themselves by detecting me, and make the experiment on a square perch of their young plantation; a failure will no doubt expose me, but I am too well acquainted with inveterate incredulity to expect that success would convince.

I have not any young plantations, yet I made the experiment on one of twenty-five years standing, and completely closed above; I confess I failed, yet the experiment led to some advantage. My plantation bounded my lawn, generally in pasture, but two years ago in meadow; I weeded carefully through the winter; in April and beginning of May the florin looked lively and vigorous; my expectations were high; but when late in May, the umbrella closed thick above, the luxuriance of vegetation ceased, and my florin was not worth mowing; but from that time, I observe the sole to be closer and more beautiful, and I often now see my sheep and other cattle grazing it, which I never observed before.

I have already shown at length the importance of florin in a national point of view, as the indirect means of supplying us with provi-

sions adequate to our wants ; it shall now appear capable of contributing materially to our national strength and defence.

I little thought, when I was developing successively the different valuable qualities of fiorin, that I should discover this diminutive grass might be made an important friend to our Navy, and a useful associate in raising *oak* for its supply.

We have proof, even from the Legislature, that oak timber, fit for the building our largest ships, is becoming scarce ; a plan, therefore, for encouraging landholders to lay out plantations of this valuable tree, and which makes it their interest to do so, should be received with attention\*.

The properties of the oak, connected with my plan, are two—a distinct solitary stem, and great slowness of growth. Each of these is highly favourable to the measure I propose, that is, to make the same enclosure an oak plantation and a fiorin meadow ; by the former, the erect oaks will little interfere with the fiorin

\* The prohibition to build ships above a certain tonnage, shows the scarcity of great timber is dreaded ; and the Queries of the Commissioners of Woods and Forests, relative to the cultivation and management of Navy timber, proves that the subject is at present much attended to.

crop; by the latter, the proprietor will long enjoy the benefit of a valuable fiorin meadow.

I am so sanguine in my hopes that important consequences will follow a frequent adoption of this practice, that I impose upon those who call upon me to aid them in laying out ground for fiorin, and putting it out for them as an indispensable condition, that they enclose also, at least an acre for me, to be consigned to oak and fiorin. The Earl of Caledon, Sir James Stewart, Bart. and other gentlemen, have acceded to my terms, and are preparing to fulfil them. The directions I give are, that the ground selected for the purpose, be that pronounced by those well acquainted with the natural history of the oak, to be the most congenial to it. The situation must not be greatly exposed, as we cannot afford to let the plants in an early stage give shelter to each other, and afterwards be thinned; they must be as far asunder as prudence will permit, that they may not interfere more than is necessary with the valuable crop about them; still, however, keeping in memory, that the oak is the primary object, the fiorin but secondary.

I claim no knowledge of the science of planting; those who are best acquainted with it are to determine—since the object is to let the oak

attain its greatest growth, and highest perfection—whether it be more prudent to sow the acorn on the spot where the tree is to remain, or to plant it in that spot from a nursery, or in either case, to cut down the original plant, and rely upon the second shoot for the future tree.

If these questions be not already decided, I open a good field for experiment; each mode may be tried separately, until the point be finally established. The fiorin, as well as the young oak, will require to be weeded; and I know that in a very early stage, the stolones may press upon the young tendrils; in that case I have no objection to their being considered as weeds, and cleared away to a proper distance from the tree.

I have been told, that a fiorin crop will in general interfere with young trees, and choak them up by its great luxuriance. I reply, this grass, when in exclusive possession, will interfere less than the spontaneous rush of mixed intruders, most of which growing erect, hold up the fiorin, and rise high about the plants, while the mat of pure fiorin falls flat; no doubt, whatever injures the tendrils, fiorin or weeds, must be cleared away to a sufficient distance.

The soil of our fiorin meadow will no doubt require to be occasionally refreshed by manure,

and I shall probably be told, that the stimulating ingredients we mixed up in our composts, dung, ashes, lime, may be injurious to our oak. I admit the objection may have weight, and therefore, until the question be better understood, direct no other top-dressing to be used than plain earth. Yet it is well worth ascertaining, whether by enriching and deepening the soil of our oak plantations (for which we shall be well paid), we serve, or injure this valuable tree; while the experiment can be so easily made as by treating differently separate parts of our plantation meadow, we should not be precipitate in assuming opinions to be facts.

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Having now detailed the numerous advantages that I conceive must follow the general adoption of fiorin culture, I must not forget, that in the course of my argument, I made two assumptions, one of which at least remains to be proved, to wit, *that a conviction of the great value of fiorin is fully established.*

I cannot deny that a very extended conviction, at least of this value, is indispensably necessary to the complete success of my speculations; I hope, therefore, this necessity will excuse the tedious detail I am obliged to enter

into, for the purpose of establishing the truth of the several assertions I have made on the subject of the distinct values of fiorin, in order that I may impress this desirable conviction.

I shall divide my witnesses into three classes : 1st, Those who examined my Portrush meadow, whose testimony can go no farther than to great luxuriance. 2dly, Those of my own country who examined my Clonfacle meadows, and entering minutely into the subject, made themselves masters of the several points upon which the great value of fiorin turned. 3dly, Those who were sent or came from Scotland, and remote parts of Ireland, for the purpose of examining into the truth of my facts.

I must commence with a long list of noble personages, which I know will expose me to ridicule, as making a pompous display of my lordly acquaintance ; but it must be remembered, that Portrush is near to the Giant's Causeway, and that of late years my fiorin grass is become an object of curiosity, and one of the *lions* now pointed out to those who come to visit that wonderful production of Nature.

My roll therefore rather enumerates those who for the last three or four years have visited the Giant's Causeway, than claims to be a list of my personal acquaintance. I commence with

His Excellency the Duke of Richmond, who did me the honour of calling to see my fiorin grass; the Duke of Buccleugh, the Marquis of Hertford, the Earl of Dartmouth, Earl O'Neil, Earl of Selkirk, Earl of Farnham, Lord Jocelyn, Lords Blantyre, and Headley; Sir George Hill, Mr. Dickenson, member for Somersetshire, Mr. M'Naghten, for Antrim; with many others whom it would be tedious to enumerate. Every one of these personages was highly gratified by the luxuriance of my fiorin crop, and as many of them as I took the liberty of putting my usual questions to—*Have your expectations been equalled by what you see?* invariably replied—“far exceeded.”

Many of them have given a more satisfactory proof that they were convinced of the great value of fiorin; from which others were precluded by my temporary absence from home.

The Marquis of Hertford cultivates fiorin at Ragley; and soon after he saw my Portrush meadow, permitted me, at his own expence, to make what will probably turn out the most important experiment ever tried in the agricultural line; that of laying down a fiorin meadow of seven acres, on his peaty mountain, at an elevation of 900 feet; a measure that has completely succeeded.

The Earl of Selkirk, so soon as he returned home, began to lay down fiorin at Kirkcudbright.

Sir George Hill immediately commenced fiorin culture with spirit. The extent to which Mr. M'Naghten has also carried it, and his great success, are already stated.

Mr. Dickenson soon became a sanguine amateur, planted fiorin largely at Kingsweston, and was instrumental in procuring me high and flattering notice from the Bath Agricultural Society. At Mr. Dickenson's request I drew up a Memoir for him on the cultivation of fiorin in Jamaica, where food for their cattle is much wanted—this was pure speculation, but that I was well founded, appears by the complete success with which fiorin is cultivated in another tropical climate, Madras.

The visits that were paid to my Clonfecla fiorin meadows, proved more instructive, for as my steadier residence on my glebe included most of the year, I was able to challenge inspection at the times when the several positions I had laid down relative to the value, and strange qualities of this grass, all admitted of proof on the spot.

My noble and other friends, and neighbours, had most of them gratified their curiosity before, but when now called upon, they came in a sort

of official capacity, to pronounce on the truth of facts somewhat paradoxical, but repeatedly pressed upon the world by me.

The Earl of Gosford, and Lord Viscount Northland, inspected my crops standing, and mowed, and in their magisterial capacity, examined my people on oath, relative to the periods in which the several portions were cut, the accurate measures of what were weighed, the amount by the acre, and particularly asked, if when weighed the hay was so effectually dry, as to be fairly merchantable by weight between man and man? My noble friends signed the depositions; and on their own part certified for the excellence of the hay, the perfectly safe condition such lap-cocks were in as they found deep covered with snow.

They both tried their own horses with fiorin hay and the best common hay, and bear testimony to the decided preference they gave to the former; while Lord Gosford certifies, that he observed from his window the sheep strongly marking the same preference.

To all these facts (save weight) Gen. Trotter also bears testimony, having from his vicinity, as Commandant of Charlemont Fort, often amused himself with the same experiments, and often examined my hay in all stages. Other

magistrates also examined my people on oath, and the depositions signed by them are published. My neighbour and representative Mr. Richardson, also inspected my crops more than once, made the same experiments, and authorises me to say, with the same results.

The Earl of Caledon, and the Bishop of Down, examined my crops, and witnessing the process of my hay-making late in October, this year (1812), allow me to quote their authority for the excellent condition in which they found it, notwithstanding the dreadful season.

My pupil, the Right Hon. Isaac Corry, chose to survey, and measure for himself, and found in another year, the amount greater than ever. My friend Mr. Greenough, also measured for himself, and weighed when green in 1811, leaving to Lieut. Col. Sheldrake, (Gen. Trotter's successor) to weigh when perfectly dry, and to transmit the amount to me in England. It proved the same as Mr. Corry's two years before, above eight ton to the English acre. On my return, I was amused by Col. Sheldrake's account of his horror when he saw the immense fleece upon whose amount his credit was to be staked.

This detail I am aware must be tedious, but well knowing the dogged incredulity I have to

encounter, I am under the necessity of overpowering it by a cloud of witnesses.

I believe it to be a maxim in law, that a *fact* is best established when the witnesses are those who *ought* to have been present at the transaction. Apply this to the two classes of witnesses I have produced—the first an unconnected mass, viewing my grass successively as a secondary object, in the course of their pursuit of another more important one, and not called upon by me.

The second class all (except Mr. Corry) my neighbours, and exactly those who ought to have been called upon to attest a fact in their vicinity.

There is a third class of witnesses of quite a different description;—those who came, or were sent, from distant countries to obtain satisfaction on the fiorin subject; gentlemen, not one of whom I had any knowledge of until fiorin made us acquainted.

I commence with Lieut. Gen. Sir James Stewart, a zealous agriculturist, led to Clonfecla by the fame of fiorin. When we were proceeding to my meadows, Sir James asked permission for his servant, fond of farming, to come with us. The Baronet was highly delighted with what he saw, and as we were returning, whispered

me, that when he went to dress, he would privately ask his servant what he thought of my grass. I saw by Sir James's countenance as he came down to dinner, that he had got some joke; he told us, that when he questioned his servant upon what he had seen, he replied; "*it is all folly, for they will not believe one word of it when we go home.*"

Mr. Farish was sent by his employer, Mr. Miller, of Dalswinton, from Dumfries, to inspect and make report to him on the subject of fiorin. Mr. Farish, on his return, published a minute account of what he had seen at Clonfecle

The Agricultural Societies of Kirkcudbright and Wigtonshire sent a Committee to Clonfecle to inspect and report,—their report is published, satisfactory, and flattering. Mr. Scott of Hampshire, accompanied this Committee, and on his return published in his own county a most favourable report.

Not many weeks ago, Mr. Newenham, Vice-President of the Cork Agricultural Society, came to Portrush, where I showed him my fiorin; he thence proceeded to Clonfecle, where, under my written directions, he examined every thing deliberately; Mr. Newenham inspected also Lord Hertford's mountain meadow, near Belfast; I

have not seen him since; his report also is published, but has not yet reached me. I have reason to think it will not be unfavourable.

*Conviction* of the value of fiorin is the point I am labouring to establish; let us see if inspection of my crops impressed *conviction* on those strangers who came so far to view them; their reports may seem sufficiently to show they were fully convinced, but we have far better proof that their *conviction* was complete, from their subsequent actions.

Sir James Stewart, without waiting until he returned, wrote home to his people instantly to lay down fiorin for him, in the places he pointed out; and when I returned his visit, advanced with still greater spirit; and I answer for it, if my directions be implicitly followed (as I have every reason to expect) that fiorin meadow will soon make an important addition to Sir James's large fortune, and I hear with pleasure that his example, and spirit, are putting all Lanarkshire into action.

The *conviction* produced upon Mr. Miller by Mr. Farish's report, hurried him into fiorin culture to an extent scarcely credible: I have already given his own statement of it.

Mr. Boyd, President of the Wigtonshire Society, was sent to inspect my crops very late in

October 1811. When I returned his visit early in April 1812, I found that in the interval, he had laid down floric with great skill in different places; some of these were on such desperate mire, that though I had good hopes, I also had my doubts, of Mr. Boyd's success, and unwilling to commit my favourite grass to the test of so desperate an experiment, I stated at the meeting of the Agricultural Society at Castle Douglas, that although I believed Mr. Boyd would succeed, I did not consider myself as pledged for the issue; that my pupil was bolder than his master, and had encountered a more desperate soil than I would have ventured upon. In fact, my friend's moor is one of the most desperate I ever saw, and so well known in Galloway, that an incorrigible boy is commonly said, as I am told, *to be as bad as the Flow of Burnane*.

My fears were vain, as two days ago a letter from Wigton says to me—"It gives me great pleasure to inform you, that Mr. Boyd's plantation (two acres and a half) on the great road, has produced an immense crop, and operated like magic on some of the unbelievers, particularly a Mr. —, whom you met at Monreith in April; at our Agricultural Meeting held at Wigton, October 13th, this same

gentleman, unable to resist the testimony of his senses, proposed that Mr. Boyd should be presented with a gold medal, for having shown this part of the country the method how to raise a magnificent crop of valuable grass on worthless surface ; the motion was cheerfully agreed to."

This Wigton gentleman was not the only person who could not resist the testimony of his senses ; the same evidence convinced another more eminent personage, whose name must give great weight to any opinion upon agricultural subjects he thinks proper to support.

My first intercourse with Mr. Curwen was by letter : he wrote to me that he had long been an' enemy to fiorin ; he stated the circumstance which induced him to suspect he was wrong ; and open to conviction, he sought the means of obtaining it. Hearing much of a luxuriant fiorin meadow then in full growth at General Dirom's, near Annan, he went to Scotland to see it, and as he tells me, *could not resist the evidence of his senses.*"

Mr. Curwen's letter proceeds to tell me he would soon take a public opportunity of retracting his errors, which he did at his great Agricultural Meeting in Workington, where, in my presence, he also encouraged his numerous te-

nants to cultivate fiorin, promising them that if it failed, he would repay them whatever expence they had incurred. . Where *conviction* is the object, I am sure I shall be excused for stepping aside to introduce so important a testimony as Mr. Curwen's.

My next inspector, Mr. M'Culloch, of Ardwell, took a new method of showing his zeal in the fiorin cause; he consigned a beautiful and well circumstanced meadow to the Agricultural Society of the Stewartry of Kirkcudbright, to be dedicated to experiments on fiorin, he undertaking to manage the irrigated part under my directions.

Thomas Hobbes Scott, Esq. of Hampshire, accompanied the Scotch Committee to Clonfeacle, and published his report in the paper of his own county. Mr. Scott too entered upon fiorin culture with spirit, selected ground at Thornhill, which he was pleased to call Clonfeacle, and laid down his stolones, little disturbed by the ridicule of his neighbours, who laughed at him for sowing squitch grass.

Mr. Newenham was my last inspector; his report is just published in the Cork Agricultural Magazine. I shall take the liberty of making an extract. "The fiorin grass on the moery-

low ground at Clonfecla was uncommonly heavy, the land appeared to be loaded with grass, which lay in a direction from north to south\*, closer than any thing I ever saw grow from the surface of the earth; the stalks being from three to four feet long, and occasionally even six feet; the produce was certainly three or four times greater than any bottom meadow I had ever seen."

The assumption I have made that fiorin crops of hay are treble the amount of those from other grasses, receives much countenance from this report of Mr. Newenham, though vague.

I have this day received a letter from Mr. Baird, of Shott's Iron Works, near Glasgow. He says, "The mower who cut the piece of fiorin grass, is much in the habit of cutting rye-grass; he says, that the crop is equal in bulk to a crop of rye-grass of 300 stone per acre; this is surely very great, considering that I did not begin to plant it till the middle of May last." The Lanark stone is 22 lb., of course Mr. Baird's

\* A curious property of fiorin grass was discovered by the Marchioness of Salisbury, at Hatfield, in Hertfordshire, who observed that her fiorin stolones all pointed to the north as true as the needle. I have found the same rule to hold in every fiorin meadow I have examined.

crop should amount to four English load, at 1800lbs. per acre.

Here too every thing is vague, but it is important to have the certainty of at least a great crop of fiorin having been produced from ground laid down in the middle of May of the same year.

The following statements of quantity of fiorin crop, are established with precision, viz.

1808, Seven ton, four hundred, one quarter, four pounds.

1809, Eight ton, five hundred, two quarters, twenty-four pounds.

1810, Season so desperate, never weighed.

1811, Eight ton and upwards.

The first amount, 1808, was established by affidavit before the Earl of Gosford ; 1809 rests upon the credit of Mr. Corry, who employed a surveyor, and weighed it himself; 1811, upon that of Colonel Sheldrake, who weighed it himself, and transmitted his certificate to me in Scotland, where it is deposited with the papers of the Agricultural Society of Kirkcudbright ; hence a defect of precision from the absence of the document.

The amount of the Bishop of Derry's mea-

dow, seven ton one-half, and Mr. M'Naghten's, six ton eight hundred, are both established by affidavit; the English acre was always used.

My friend Mr. Young, of Harbourn, my earliest Scotch correspondent, writes to me on the 22d of November, on the subject of his winter hay-making—the point which has excited most incredibility, and which has yet rested solely on my own credit. He says, “the fiorin I cut since my return from the elections, is now in the course of being made into hay; it has already experienced every extremity of bad weather; and yet I flatter myself I shall succeed as well as I did formerly, and I must confess, for the sake of confirming my experiment, and demonstrating at the same time the truth of what is still called in question in this country, the much greater weight of produce than could be had from any other hay crop; I have rather been pleased than otherwise with the severity of the weather.”

Anxious for information on the subject of the Bishop of Derry's extensive crops, particularly how his Lordship's hay-making went on in this terrible season, I wrote to his brother; his reply is not so satisfactory as I hoped; I shall, however, give it. He says—“I have not been

at Fahan since we met there together, but about a fortnight ago, the Bishop told me he had his hay in sap-cock, and that his mowers informed him it was a much heavier crop than that which they mowed last year; the Bishop said that the sap-cocks stood so close together, that when he wanted to expose the under part of them to the air, he could not place them upon ground which had not been already covered by them: I think the Bishop's crop will be as good as any of yours. I was glad to have it in my power to shew my brother George your hay-making, as the wet season gave a good opportunity of proving to him that the fiorin is as little injured by weather when severed from the ground, as it is while growing.

“ Yours,

“ CHARLES KNOX.”

When I walked with the two brothers through my meadow, November 30th, I called upon them to find for me a single handful damaged by the severe weather: they authorise me to say they could not. My crop was finally saved December 8th.

I have not made any inquiry about Mr. M'Naghten's crop, knowing it to have been

hitherto his custom to consume his whole crop through the winter *green*; but I have no doubt that it was greater than either the Bishop's or mine.

I could add still more to this great mass of evidence, but I am aware I have been already too tedious, and am convinced that where such a variety of proofs as I have here given, fail to produce conviction, it is because they encounter a determination *not* to be convinced.

I lament, therefore, that a *general conviction* of the great value of fiorin grass is absolutely necessary to procure for the nation the immense benefits that might be derived from its extended culture;—that conviction once established, all these benefits are regular conclusions fairly deduced. One of my premises was, that fiorin grass produced *treble* crops of hay—that at least is completely established, as of six crops carefully weighed, every one of them far exceeded treble the highest average ever made for an hay crop. This must help to bring on the conviction which for the regularity of argument, I have as my second premise assumed to have taken place.

I shall now enable every man that takes an interest in the question, to obtain that conviction for himself, on the easiest terms, and by an ex-

periment for which the possession of land is not necessary, being equally open to the farmer and to the citizen. Let whoever desires to satisfy himself, procure a common earthen flower-pot, fill it with rich earth, coil up a fiorin stolo of a foot long or more, lay it upon the surface of the pot, then cover it over lightly with *rich compost*, *street-dung*, peat ashes, or some such stimulating material; set it upon his window-sill, occasionally watering it, and I answer for it, that the young stolones will in the course of the autumn hang down in vast numbers of four and five feet long, showing a luxuriance to which no other grass could approximate.

Such was the mode in which I treated the stolo sent to me by my friend Mr. Dickenson, from the north wall of his parish church at Somerton, and also, the stolo he sent me from Dartmoor mountain; the result was the same in both, each proving themselves real fiorin by the abundance and length of their pendulous stolones.

I hope those who feel an irresistible propensity to doubt my positions relative to the great luxuriance of fiorin grass, will adopt this simple mode of satisfying themselves. Should they decline taking so much trouble, I request them to forbear descanting on a subject which they

do not understand, reminding them, as before,  
of the old adage

*Publica lex hominum naturaue continet hoc Fas,  
Ut teneat vetitos inscitia debilis actus.*

W. RICHARDSON, D. D.

*Moy, Ireland, }  
December 1, 1812. }*

## APPENDIX.

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SIR HUMPHRY DAVY, in his important Work just published, entitled "THE ELEMENTS OF AGRICULTURAL CHEMISTRY," has introduced *An account of the results of Experiments on the produce and nutritive qualities of grasses and other plants used as the food of animals, instituted by the Duke of Bedford.*—The statements which follow are extracted from this publication, which contains a body of most curious information relative to the comparative merits and value of the different species and varieties of grasses, an object of the highest importance in practical agriculture.

"Spots of ground, each containing four square feet, in the garden at Woburn Abbey, were inclosed by boards in such a manner that there was no lateral communication between the earth included by the boards and that of the garden. The soil was removed in the inclosures, and new soils supplied; or mixtures of soils were made in them, to furnish as far as possible to the different grasses those soils which seem most favourable to their growth; a few varieties being adopted for the purpose of ascertaining the effect of different soils on the same plant.

"The grasses were either planted or sown, and their produce cut, and collected, and dried at the proper seasons in summer and autumn, by Mr. George Sinclair, his Grace's gardener. For the purpose of determining as far as possible the nutritive powers of the different species, equal weights of the dry grasses were acted upon by hot water, till all their soluble parts were dissolved; the solution was then evaporated to dryness by a gentle heat in a proper stove, and the matter obtained carefully weighed.—

This part of the process was likewise conducted with much address and intelligence by Mr. Sinclair, by whom all the details and calculations were furnished.—This mode of determining the nutritive power of the grasses by the quantity of matter they contain; soluble in water, is sufficiently accurate for all the purposes of agricultural investigation.

“*Agrostis Stolonifera*, Eng. Bot. 1532; Withering Bot. 2, 181—(Fiorin, Dr. Richardson)—Creeping Bent Grass, native of Britain.

At the time of *flowering\**, the produce from a bog soil was—

|                                                                                                                                                   | lbs.   | oz. | dr. |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|-----|
| Grass, ..... per acre                                                                                                                             | 17,696 | 4   | 0   |
| When dry, .....                                                                                                                                   | 7963   | 5   | 0   |
| Weight lost by the produce of one acre ..                                                                                                         | 9732   | 15  | 0   |
| Nutritive matter, .....                                                                                                                           | 967    | 12  | 0   |
| At the time the seed is ripe the produce is                                                                                                       | 19,057 | 8   | 0   |
| When dry, .....                                                                                                                                   | 8575   | 14  | 0   |
| Weight lost, .....                                                                                                                                | 10,481 | 10  | 0   |
| Nutritive matter, .....                                                                                                                           | 1042   | 3   | 5   |
| The weight of nutritive matter which is lost by taking<br>the crop at the time of flowering, being nearly one-four-<br>teenth of its value, ..... | 74     | 7   | 2   |

*Agrostis Stolonifera*, Var. *angustifolia*—Creeping Bent, with narrow leaves—native of Britain.

At the time the seed is ripe, the produce from a bog soil—

|                                                                                                                                                             |        |    |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|---|
| Grass, per acre, .....                                                                                                                                      | 16,335 | 0  | 0 |
| When dry, .....                                                                                                                                             | 7350   | 12 | 0 |
| Lost in drying, .....                                                                                                                                       | 8984   | 4  | 0 |
| Nutritive matter, .....                                                                                                                                     | 765    | 11 |   |
| The weight of nutritive matter produced by one acre of the<br><i>Agrostis Stolonifera</i> , exceeding that of the variety in<br>proportion, is 6 to 8 ..... | 276    | 8  | 1 |

\* See Correspondence at the end of the pamphlet.

The above details will assist the farmer in deciding upon the comparative value of this grass. From careful examination, it will doubtless be found to possess merits well worthy of attention, though perhaps not so great as has been supposed, if the natural place of its growth and habits be impartially taken into the account.

Of its productive powers in England, though by some it has been doubted, there are now the most satisfactory proofs, and its valuable qualities are every day becoming better understood; of this Lady Hardwicke has given an account, wherein it appears, that twenty-three milch-cows and one young horse, besides a number of pigs, were kept a fortnight on the produce of one acre of fiorin. The following statements confirm what has been advanced on the subject of its nutritious powers\*.

At a recent meeting of the Bath Society, the Chairman stated the following result of a comparison made, of the milk-giving quality of fiorin and that of common food, viz. Two cows had been put on fiorin for a fortnight; the milk was richer than the milk of the cows fed with ordinary food, consisting of clover-hay, straw, and a small quantity of steamed potatoes. The quantity of fiorin given to the other two cows, was 30 lb. weight of green fiorin, and common straw 15 lb. The butter churned from twelve quarts of milk, fed on the potatoes and clover hay, was 22 oz. The produce from an equal quantity of milk taken from the cows fed on fiorin, was 31½ oz. being nearly one-third more from the milk fed upon fiorin, and the butter of a superior quality.

\* The cultivation of fiorin is now extending rapidly in England and Wales. The plantation of the fens of Cambridgeshire, has been lately undertaken by Dr. Richardson, under the sanction of the Earl of Hardwicke; and the wastes of Dartmoor, in Devonshire, have attracted the attention of the Bath and West of England Society, who have offered various premiums to encourage the fiorin culture in that extensive district.

A brief account of an analytical investigation of the fiorin grass, has been laid before the Kirwanian Society of Dublin, by its Right Hon. President (George Knox). From this it appears, that at least one-fourth part of the dried grass is really a nutritious matter, which may be easily extracted from its mere fibrous part, by digesting the grass in warm water; and of this one-fourth, it is supposed that more than one-half is something very similar to sugar. On distillation, it affords a considerable quantity of alcohol; and there is reason to believe, that if the process were conducted in a large way, and with judicious management, not less than two ounces of a spirit of the specific gravity of 930° would be obtained from every pound of the dried grass. This experiment has been completed, and Dr. Richardson says a gallon of excellent spirits was obtained, part of which he drank in punch, strong at four waters; the flavour far more delicate than that of whiskey, and liker to Geneva.

Fiorin is easy to propagate, and we can at once clothe our grounds with it completely to any extent, at a small expence. This facility arises from the strange property the hay possesses; that of vegetating for several months after it has been mowed, saved and housed. In laying down fiorin, it is not the seed, however abundant, that is sown, but the hay itself. The saved hay or strings gathered in drains, or cut from the meadow expressly for the purpose, are to be thinly scattered on clean well prepared ground, then lightly covered with loose soil, so as to hold them down, but not entirely to cover them. If this be done carefully in winter, or very early in spring, a full crop is insured for the very next season. Care must be taken till it is established, to keep it clear of other grasses or weeds, and it must be fenced from cattle, as all stock will eat it greedily on account of its

sweetness. A doubt having been started, that the English and Irish fiorin are of different quality, Dr. Richardson negatives the opinion entirely, and insists that the cultivator will find no inferiority in the former, if he strictly attends to *weeding his crop*, and defers cutting his hay *till October*.

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*The following Correspondence on the subject of this Appendix, taken from a Periodical Publication, is here annexed, in justice to the respective Writers.*

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*To the Editor of the Agricultural Magazine.*

SIR,

MR. HARDING, bookseller, St. James's-street, has lately published an Essay I gave him, on the *Discovery of Fiorin Grass, and the beneficial Effects a more extended Cultivation of it will produce to the Nation*.

To this Essay the Editor (in his zeal to serve the cause) has added an Appendix of his own, detailing some recent experiments upon this grass; the results of which seem to him very favourable.

This Appendix, sent into the world along with my Essay, may seem to be sanctioned by my authority, and the results there stated to be approved by *me*, which is by no means the case.

The experiments are made with the greatest care, by Mr. George Sinclair, gardener to His Grace the Duke of Bedford; and from *his* mode of proceeding, it is obvious that Mr. Sinclair is thoroughly acquainted with the grassy tribe, so far as it was then known to practical agriculturists.

Mr. Sinclair's object (and probably that of His Grace) was to ascertain which of the gramina would afford most nutritive matter to the cattle to be fed upon it, and the mode he pursued proves he was well acquainted with the *culmiferous* tribe (the only description hitherto applied to house-feeding); that he knew the period at which the juices attained their highest perfection (that of their inflorescence), and the period during which the grass might be mowed with advantage; to wit, the interval between the inflorescence and the ripening of the seed.

Mr. Sinclair unfortunately does not give the date of his experiments; but as the fiorin shews its first panicle on the 20th of June, I think it probable he cut his last plot on the second week in August, when a fiorin crop was far short of its perfection, either in quality or quantity\*.

The *culmi* of grasses have hitherto constituted by far the most valuable part of our hay; Mr. Sinclair, therefore, wisely looked to *their* periods of perfection; he was not aware that a fiorin crop does not consist of *culmi*, which are withered and wasted long before the *stolones*, (which really form a fiorin crop) have attained their period of perfection; of course, that his experiment was made on hay composed of fiorin *culmi* (which in their best state we hold cheap) and *unripe nascent stolones*, which would lose far more in drying than had they been in a more advanced stage.

Hence, Mr. Sinclair's experiment to find the nutritive matter contained in fiorin, has produced a result totally different from what he would have obtained, had he possessed the same knowledge of the *stoloniferous* tribe of grasses, and their natural history, that he has shewn he does of the *culmiferous*.

The high reputation of Woburn for skill in every

\* The time of flowering, July 28th; time of ripening the seed, August 28th.—E.

branch of agriculture, stamps a credit upon every report proceeding from that respectable source; and, like the pole-star, guides the practical farmer in the line he is to pursue.

Hence, an error from that same source, will more generally mislead, than if it had proceeded from any other.

I hope, therefore, the Noble Proprietor, and his intelligent gardener, will excuse me for correcting the mistakes they fell into on a subject *new* to them, and for shewing what the results of the Woburn experiment must have been, had the mowing of the fiorin plots been deferred until November 10th, when the crops would have attained their full growth, when their juices would have been concocted, and their saccharum formed; in doing this, I shall quote little other authority than what is already stated in the Editor's Appendix, none of which authority was brought forward by me.

First, as to *quantity* of produce; Mr. Sinclair obtained 7963 lb. to the English acre (about *four* tons), while the public has evidence repeatedly before them, of my fiorin having produced eight tons more than once, and scarcely ever less than seven tons and a half.

With Mr. Sinclair, the loss of weight was 9732 lb., considerably more than the weight of the dry hay (7963 lb.); full proof that the hay was cut in too early a stage of its growth; for both General Sir James Stewart and I myself, made the same experiment, with much accuracy, but at later periods, and had the same results; to wit, that the *loss* was to the *dry hay* as *three* to *five*.

It is true, the quantity both of dry hay and nutritive matter, considerably increased when mowing was delayed until the seed became ripe; still the nutritive matter was less than one-eighth of the dry hay.

But it appears from the Transactions of the Kirwanian Society in Dublin, that the President, the Hon. George

Knox, obtained from dried fiorin grass, more than *one-fourth* its weight of nutritive matter, and this hay was mowed October 29th, at Clonsilla.

The nutritive powers of fiorin grass in *practice*, are also established in the Appendix, and in both instances mowed at a still later period.

The Editor quotes from Lady Hardwicke, the immense stock fed from one acre of fiorin; but her Ladyship was so good as to inform me that her fiorin was cut in *November* and *December*.

The surprising effect of this grass on *milk* and *butter*, is quoted from a Report made by the President of the Bath Society: it was General Sir James Stewart made the experiment, and his fiorin was mowed in November.

I trust these statements will induce *Woburn* to repeat her experiments on fiorin; and shall I be successful in persuading Mr. Sinclair to abstain from mowing until November 10th; I answer for it the quantity of dry hay will be *doubled*, and that of nutritive matter *quadrupled*, on a given acre.

The Editor says, Dr. Richardson negatives the position that the *Irish* fiorin is different from the *English*; I, no doubt, have often received stolones of true fiorin from England.

A most respectable botanist (Dr. Thornton) has lately taken up this question: it is of much importance, and I have little doubt, but that with such a powerful associate, we shall soon throw much light on the subject; I must, however, defer entering upon the discussion at present, and shall in your next monthly publication reply to a very flattering letter of Dr. Thornton's, given in a London journal, of June 28th.

W. RICHARDSON, D.D.

*Moy, July 8, 1813.*

*To the Editor of the Agricultural Magazine.*

SIR,

THE number of your valuable Magazine, which contains Dr. Richardson's Letter, in reply to an Appendix annexed to his Essay on Fiorin, did not come into my possession until within these few days, otherwise it should have had an earlier notice from me. To discover truth, and to point out the path that will conduct from error, was evidently Dr. Richardson's design in the communication alluded to: for my own part, I beg to assure Dr. Richardson through this medium, that I shall always be glad to learn of him any thing, which I believe him to be so well qualified to teach as that of the culture, properties, and value of fiorin. It is therefore with satisfaction that I observe the fear he expresses, of farmers being led into error by the results of the experiments on fiorin, as quoted in the Appendix alluded to, is groundless; for truth can never suffer by truth, and in this instance it is well exemplified. Had Dr. Richardson duly considered the design of that experiment, which is manifest from the details, to be that of affording proofs of its *comparative value* at the time of *flowering*, and at the time of *perfecting its seed*, and not of its greatest individual value, he must have viewed these results, as facts which added to our knowledge of the nature and properties of this grass, which, compared with the results of his own, or with the experiments of others, made on this grass in the month of November, would prove to us the loss which would be sustained, if that grass was mown at those earlier stages of its growth. At the time those experiments were made, I had concluded, from the history of fiorin, as given to us by Dr. Richardson, compared with my own observations, that its greatest individual value must be when the

stolones attained to the greatest degree of perfection, which appeared to be (in the plants cultivated here) about the end of November, or beginning of December. To make this manifest by experiment was then intended, but from the peculiar order in which the different parts of the experiments followed each other, this part with respect to fiorin, and to several other species of grass, was unavoidably deferred until the ensuing season; and I doubt not but that the results will prove to be nearly what Dr. Richardson has concluded *à priori*; to wit, that its produce will be much greater in quantity and quality; but that in proportion it loses so much less of its weight in drying at the season, I have some doubt. With regard to the process made use of to ascertain the weight which a given quantity of grass loses in drying, it may be of use to observe, that when grass is newly mown it consists of three parts, viz. woody fibre, nutritive matter, and superfluous moisture; and when the proportion of the last is accurately ascertained, it affords a good indication of the value of a grass, whether most profitable for green food or hay; but if great care be not had to the state of the grass when mown, very erroneous results will be the consequence, particularly with those species which have compressed channeled leaves, and furnished with large stipulæ or sheath scales: in these, dew or rain water will often be secreted for many days, even during warm weather. Hence if this is overlooked, the weight lost will be greater than the truth, to wit, the quantity of unripe or unconcocted sap, which the grass contained at the time it was mown.

Dr. Richardson observes, that I have unfortunately omitted to give the dates of the experiments; but if Dr. Richardson will be at the trouble to look into the account of these experiments, he will find the respective dates of each assembled together in a table, the better to shew their

bearings to each other. It is likewise singular, that Dr. Richardson or the Editor should overlook the trial which was made with florin mown in winter, as detailed in Sir H. Davy's important work on agricultural chemistry, as that trial makes up the deficiency complained of\*. The cause of the contradictory opinions of the productive powers of florin, founded even upon actual experiment, in this country is capable of an easy solution. There are seven species and varieties of agrostis, which are stoloniferous, that is, producing stolones, strings, or runners: four of these are very common, they are all under cultivation here, and prove to be decidedly inferior in every respect to Dr. Richardson's variety, so much so, as justly to merit every opprobrious epithet that has been bestowed upon them. Dr. Richardson's variety I have only found partially in low moist soils, generally in distinct patches, without intermixture with any of the other stoloniferous kinds. Dr. Richardson has till very lately uniformly urged that florin is very common, and that it was to be found in every kind of soil, and in all situations, describing it only by the character of producing stolones; hence it is easy to conceive, that excepting those who had the plants from Dr. Richardson's stock, the results of the experiment of nearly all others must have been directly contradictory of Dr. Richardson's statements, though made upon stolones answering to his general description; and hence the justification of those who made experiments upon these grasses, supposing them to be *florin*, and conferred the titles of "Red Ro-

\* In an experiment on the quantities of soluble or nutritive matters afforded by different vegetable substances: Florin cut at the time of *ripening the seed*, was found to contain 54 parts, viz. mucilage 46, saccharine 5, gluten 1, extract or matter rendered insoluble during evaporation 2. Florin cut in *winter*, contained 76 parts, viz. mucilage 64, saccharine 8, gluten 1, extract 3. —*Sir H. Davy's Chemistry*, p. 131.—E.

bin," "rule weed," "plague of farmers," &c. &c. upon it. Two of the grasses just mentioned are varieties of the *agrostis stolonifera*, and form the connecting links between that species and the *agrostis alba*; another of these stoloniferous grasses connects the *agrostis palustris*, and *agrostis nivealis* together, by partaking of the discriminating characters of each, as given to us in the works of our eminent botanists. The characters which distinguish these varieties from each other, I might have added here as they present themselves to me; but I observe with much pleasure, that this necessary point is now in good hands, and I doubt not when Dr. Thornton gives us these discriminating characters in his superior manner, that fuller effect will thereby be given to Dr. Richardson's discovery, and shew him that a botanist is by no means so useless in researches of this nature, as he has frequently told us.

I am, Sir,

Your obedient Servant,

G. SINCLAIR.

Woburn Abbey, }  
Sept. 5. }

THE END.



